

# VU Research Portal

## Unicompartmental Knee Arthroplasty New Insights in Surgical Results and Knee Kinematics

Zuiderbaan, H.A.

2016

### **document version**

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

### **citation for published version (APA)**

Zuiderbaan, H. A. (2016). *Unicompartmental Knee Arthroplasty New Insights in Surgical Results and Knee Kinematics*. [PhD-Thesis – Research external, graduation internal, Vrije Universiteit Amsterdam].

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

### **E-mail address:**

[vuresearchportal.ub@vu.nl](mailto:vuresearchportal.ub@vu.nl)

## Summary

Unexplainable pain following UKA and osteoarthritic progression of the non-operated compartments, are the most frequent reasons that lead to UKA revision. This thesis has the aim to get a better understanding on those two factors. **Chapter I** is a general introduction of this thesis. It consists of a brief description of the anatomy of the knee, osteoarthritis (OA) of the tibiofemoral joint and the various surgical treatment options. Furthermore it contains the following aims of the thesis;

- To report a detailed overview of the modern indications, surgical outcomes and global trends in the use of UKA and high tibial osteotomy for isolated medial unicompartmental knee osteoarthritis.
- To identify the various factors that can potentially influence subjective outcome of patients undergoing medial UKA.
- To assess the role of magnetic resonance imaging in the evaluation of symptomatic patients following UKA, where the traditional tests fail to identify the underlying etiology.
- To analyze artificial joint awareness in patients which have undergone UKA and total knee arthroplasty.
- An extensive radiographic evaluation of the congruence alterations from the contralateral compartments following UKA that can potentially influence the osteoarthritic progression of the non-operated compartments.

In **chapter II** a review of literature was conducted. Modern indications, associated results and global trends in the use of high tibial osteotomy (HTO) and unicompartmental knee arthroplasty (UKA) have been described in patients who present with isolated medial unicompartmental knee OA. Using various articles, the current literature strongly supports the strict adherence of inclusion criteria that should be respected, in order to optimize survivorship and patient satisfaction of patients undergoing HTO. Age, weight and the pre-operative radiographic severity of OA should all be taken into account when selecting a potential HTO candidate. As opposed to the strict adherence to these HTO criteria, modern reports neither prove that nor age nor BMI will influence outcome following UKA. We noted that – if both techniques are performed frequently - 10-year survivorship results can be expected from respectively 90% and 75% of the UKA and HTO, with good to excellent subjective outcome scores. We also studied the trends in the use of both techniques among the western practices. An obvious decreasing trend is reported in the use of HTO, whereas an annual rise is reported in the use of UKA. This might be the result of the less strict inclusion criteria, superior results and improvement of surgical UKA techniques.

Unexplainable pain following medial UKA remains one of the dominant reasons for revision surgery. In order to identify the various factors that can potentially influence subjective outcome, we conducted in **chapter III** a study including 104 patients that had undergone medial UKA (average follow-up 2.3 years). Based on these results, our data suggests that younger patients benefit from a higher degree of pain relief than patients 65 years of age and older who underwent medial UKA. Furthermore, we noted that patients with a post-operative lower limb alignment between 1 - 4° of varus had significant better subjective outcome results, compared to

patients with a mechanical axis degree of  $< 1^\circ$  and  $> 5^\circ$  of varus. Gender, BMI and the pre-operative osteoarthritic severity of the medial and patellofemoral compartment did not influence subjective outcome following medial UKA. A better understanding of these factors and taking them into consideration will help us to maximize clinical outcomes, fulfill patient expectations and subsequently minimize revision rates following medial UKA.

Although UKA is a very successful procedure, a subset of patients' presents with continues pain following UKA in the setting of normal radiographic and physical examination. In **chapter IV** the role of magnetic resonance imaging (MRI) was investigated in symptomatic patients that have undergone UKA where the traditional radiographs and physical examination are not aberrant. Retrospectively we identified 28 symptomatic UKA patients who underwent MRI. Based on these findings, 10 patients (36%) underwent surgery, whereas 18 patients (64%) were treated conservatively. Eighteen patients (64%) experienced improvement in pain and function after conservative or operative treatment that was based on the MRI findings. Based on these results, we conclude that MRI investigation can be a valuable diagnostic modality in the case of symptomatic UKA. Although traditional radiographs, laboratory tests and physical examination remain the cornerstone in the workup of a symptomatic UKA patient, data of this chapter suggests that MR imaging should be used as a supplemental imaging modality before an UKA is revised when the etiology remains unclear.

There is an increasing interest in the patients' perception of functional outcome. Recently a new outcome measurement was introduced that measures artificial joint awareness in patients that have undergone knee or hip arthroplasty. This score is named the Forgotten Joint Scores (FJS) and has the advantage that it is less limited by a ceiling effect; a well-known limitation of the traditional outcome scores. In **chapter V** we conducted a prospective study containing 130 patients (65 medial UKA patients, 65 TKA patients). At 1.5 and 2.5 years following surgery, we noted that patients who undergo UKA are better able to 'forget' their artificial joint in daily life compared to patients that undergo TKA. We speculate that this observed difference may be due to the fact that UKA is a more soft-tissue and bone-conserving surgical procedure than TKA. In order to optimize the outcome of patients undergoing knee arthroplasty, this study suggests that—if possible—joint-conserving surgical strategies should be pursued.

As mentioned previously, osteoarthritic progression of the contralateral compartment remains an important reason to revise a UKA. Therefore it is essential to evaluate the changes of the contralateral compartment following UKA implantation. In **chapter VI** and **chapter VII** congruence and joint space width (JSW) alterations of the opposite compartment were evaluated following respectively medial and lateral UKA. Using a novel, validated technique, we noted that a well-conducted medial UKA is able to improve contralateral compartment congruence in 82%, whereas a lateral UKA is able to improve medial compartment congruence in 58.5%. Furthermore we noted that the pre-operative significant JSW differences with the control group, were absent post-operatively. This finding suggests that the contralateral JSW is restored following UKA. Based on these results we conclude that a well-conducted UKA not only resurfaces the affected compartment but also indirectly treats the opposite compartment by improving joint congruence and restoring JSW.

In **chapter VIII** we evaluated the effect of medial UKA on post-operative patellofemoral joint (PFJ) congruence and evaluated the relationship of preoperative PFJ degeneration and clinical outcome. We retrospectively reviewed 110 patients (113 knees) who underwent medial UKA. We noted that the postoperative absolute patellar congruence angle significantly improved following medial UKA implantation. No correlation was found between preoperative PFJ congruence or degenerative PFJ severity and WOMAC scores two years following surgery. Based on these findings we conclude that the pre-operative PFJ congruence and degenerative changes do not affect clinical outcomes of the medial UKA. Our data suggests that PFJ congruence improvement following medial UKA might be the mechanistic explanation of the poor association between patellofemoral degeneration and clinical outcome.